



**KPDES Individual Permit  
Supplemental Data**

Bridge Re-alignment over the  
Licking River (KY 22)  
6-1048.00



March 18, 2010

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## **1.0 Project Background**

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The Kentucky Transportation Cabinet (KYTC) is proposing re-alignment of the Kentucky (KY) 22 bridge and approaches over the Licking River in Pendleton County. The project site is located within KYTC District 6 within the city limits of Falmouth. The project is approximately 0.5 miles in length and includes spanning the Licking River and reconstruction of the intersection of KY 22 and KY159.

KYTC conducted an integrity assessment, which assigns a value from one (1) to one hundred (100), for this bridge on KY 22. The bridge received a value of 28.2. Since the score is below fifty (50), the bridge was placed on a replacement list. The bridge assessment value in conjunction with the need to elevate the bridge above the 100- year storm elevation of the Licking River (Elev. 555 ft) are the reasons for KYTC to select this bridge for replacement.

The Licking River is classified as a “special use water” by the Kentucky Division of Water, and more specifically an “outstanding state resource water” as shown in 401 KAR 5:030 Section 3(2). Due to this classification, special consideration during design, construction, and post-construction have and will be observed. These considerations include but, are not limited to, the use of enhanced Best Management Practices (BMPs) during construction and installation of enhanced BMPs for post-construction.

## **2.0 Environmental Considerations**

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This section describes the activities that KYTC has implemented to address environmental concerns.

### **2.1 SPECIAL CONSIDERATIONS**

#### **2.1.1 Environmentally Sensitive Features**

The environmentally sensitive feature for this project is the Licking River, an "outstanding state resource water".

#### **2.1.2 Pollutants of Concern**

The main pollutant of concern for this project is sediment. The Licking River has some bank erosion along the right bank (facing downstream) which will be addressed during the clearing and grubbing stage of operations. During the construction of this project BMPs will be implemented to minimize sediment from the construction site.

#### **2.1.3 Threatened and Endangered Aquatic Species**

Fanshell (*Cyprogenia Stegaria*), Catpaw (*Epioblasma obliquata*), Clubshell (*Pleurobema clava*), Northern Riffelshell (*Epioblasma Torulosa Rangianal*), Orangefoot Pimpleback (*Plethubasus Cooperianus*), Ring Pink (*Obovaria Retusa*), Pink Mucket (*Lampsilis Abrupta*) (although noted as rare to very rare) are listed on the Kentucky Fish and Wildlife endangered species list within this reach of the river.

### **2.2 EROSION PREVENTION AND SEDIMENT CONTROL (EPSC) SWPPP**

The following site specific EPSC BMPs have been developed specifically for this project. These BMPs are over and above the standard EPSC BMPs, as indicated in the table below. The remainder of the EPSC BMPs will be represented in KYTC's SWPPP, which is jointly developed with the resident engineer and the Contractor and incorporates the Contractor's means and methods. These site-specific BMPs are also included in the EPSC BMP Template.

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Area to be Treated	Initial BMP	Enhanced/Site Specific BMP
1 – Drainage channel north of newly constructed KY 22 and east of the river (Station 109+00)	Silt Traps	Silt traps and sedimentation basin.
2 – Drainage channel south of newly constructed KY 22 and east of the river (Station 109+00)	Silt Traps	Silt traps and sedimentation basin.

**2.2.1 Design Storms**

EPSC BMPs will be designed to properly function at a 5-year/24-hour design storm, except for the sedimentation basins.

**2.2.2 Enhanced/Site Specific BMPs**

The following enhanced/site specific EPSC BMPs will be utilized on this project. These BMPs include both structural and non-structural measures. The structural BMPs are shown on the Plan drawings, contained in Attachment A. All BMPs are in accordance with Sections 212 (Erosion Control) and 213 (Water Pollution Control) of KYTC's 2008 Standard Specifications.

Structural

- Sedimentation basins: designed hydraulically for a 2-year/24-hour storm.

Non-structural

- Appropriate stock of straw ECB or straw shall be available onsite at all times.
- Straw ECB or blown straw shall be applied within 24 hours of the cessation of the land disturbing activity. If blown straw is used, the blower shall be kept on-site during land disturbing activities.
- Disturbed areas shall be stabilized prior to a rain event.
- EPSC/SWPPP inspections will be performed at least twice a week.
- Sediment control BMPs will be maintained when the sediment reaches 1/3 the depth of the BMP.

### **3.0 Antidegradation**

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#### **3.1 PUBLIC NOTICE**

The Kentucky Division of Water will public notice the draft permit and allow a public comment period of at least thirty (30) days. The notice shall be published in a daily or weekly newspaper within the area affected by the activity.

#### **3.2 ALTERNATIVES EVALUATION**

Four alternatives were evaluated during a NEPA study for this project. The four alternatives were:

- Replace the bridge with Realignment Alternative 1 that would avoid a sewage pump station on the southwest side of the river and a small cemetery on the northeast side of the river. This alignment relocates only one residence and allows connection for all properties along its length. The bridge on this alignment was set at 730 feet long to maintain a 665 foot flood way width in this location to accommodate a 100 year storm elevation of the Licking River (555 ft).
- Replace the bridge with a Realignment Alternative 2 that would impact five residences, relocating one and not allowing direct connection for two. It also impacts two churches reducing the parking lot size of one. This alignment also requires the reconstruction of a 10'x5' reinforced concrete box culvert. Alternative 2 does not provide for travel along KY 22 through a 100 year storm water level (northeast side of the river). It also does not allow for adequate turning radii for large trucks traveling southwest onto Shelby Street\KY22. Passenger vehicles with camper trailers should be able to maneuver this turn. The bridge on this alignment was set at 670 feet long to maintain a 665 foot flood way width in this location to accommodate a 100 year storm elevation of the Licking River (555 ft).
- Replace the bridge with Realignment Alternative 4 that would impact 26 homes and relocates 12. It also requires the reconstruction of four existing intersections along its length and the construction of a new one at the beginning of the project. This alternate avoids impacts to the Falmouth Water Treatment Plant. The bridge on this alignment was set at 640 feet to span the channel of the Licking River. This alignment has a straight bridge horizontally but, curved vertically. This allows for placement of the center span above the 100-year storm elevation of the Licking River (555 ft).
- No Build Alternative

The first alternative was chosen because it improves travel safety through this area and it has minimal adverse impact to receiving waters.

### **3.3 POST-CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN**

Post-construction BMPs are designed to provide long-term stormwater management to efficiently and effectively treat stormwater runoff from project sites. Post-construction BMPs treat stormwater runoff and reduce peak flows to pre-project conditions or lower. Typically, post-construction BMPs are designed to manage the first flush of runoff, meaning that it will treat the initial concentration of contaminated runoff. The pollutant concentration in the first flush is typically greater than subsequent runoff volumes in the same wet weather event. Post-construction BMPs may be designed per water quality and/or water quantity requirements.

#### **3.3.1 Post-construction SWPPP**

The following post-construction BMPs are proposed to be used on this project:

- Turf reinforcement mats: TRMs will be used in areas of concentrated flow within the project limits.
- Bank stabilization with established root materials: Existing trees along the right bank (facing downstream) will be cut at ground level to allow for equipment in the area to build the bridge deck. Trees at the waters edge will not be completely cleared and grubbed in order to leave live roots in the bank for stabilization. Trees further up the bank will be cleared and grubbed and bank stabilization procedures below will be followed.
- Bank stabilization with live stakes: The existing left bank (facing down stream) of the Licking River will be disturbed during construction. The first 10 feet of the banks will be stabilized by sloping them back at about a 3:1 slope, seeding and mulching, and treated with erosion control blanket. This will provide temporary stabilization. During the early spring, live stakes will also be placed to provide long-term stabilization. The main vegetation selection criteria were plant height and whether the plantings were native species.
- Bank stabilization with container plantings: The upper right and left banks (facing down stream) of the Licking River will be disturbed during construction. These disturbed areas will be stabilized by re-grading the areas to a 3:1 slope, installing container plantings, and seeding and mulching. The grass seed and mulch will provide short-term stabilization while the plantings will provide long-term stabilization. The main vegetation selection criteria were plant height and whether the stakes were native species.
- Enhanced silt trap: Enhanced silt traps will be used in areas where concentrated flow make an abrupt change in flow direction or an abrupt grade change. Enhanced silt traps will be used to control grade, reduce flow velocity, and capture silt from headwaters before reaching the Licking River.

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- Spill containment areas: Detention/containment basins for capturing accidental spills on the newly constructed bridge deck will be provided in accordance with KYTC's Design Memorandum No. 12-05 (Karst Policy). The detention/containment basin will have a minimum volume of 10,000 gallons. Basins will be designed to maximize the flow length between the entrance and exit.

These BMPs are over and above the standard post-construction BMPs, as indicated in the following table.

Area to be Treated	Standard BMP	Enhanced/Site Specific BMP
1 – Lower left bank (facing downstream) of the Licking River	Nothing	Bank stabilization with live stakes and ECB.
2 – Lower right bank (facing downstream)	Nothing	Bank stabilization using existing root materials along waters edge.
3 – Upper left and right banks (facing downstream) of the Licking River	Nothing	Bank stabilization with container plantings
4 – Approximately Station 102+00. End of drainage pipe north of newly constructed road.	Nothing	Turf reinforcement mat from discharge point to waters edge.
5 – Approximately Station 100+45. South of newly constructed bridge and west of Barnes Street.	Nothing	Spill containment area to manage runoff/ spills from western side of bridge.
6 – Approximately Station 108+75 to Station 109+40. Drainage ditch south of the existing KY 22.	Channel Lining	Turf reinforcement mat
7 – Approximately Station 108+75 to Station 114+00. Drainage ditches north of the newly constructed bridge and road.	Channel Lining	Turf reinforcement mat and enhanced silt trap

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8 – Approximately Station 109+25. South of newly constructed road.	None	Spill containment area to manage runoff/spill from eastern side of the newly constructed bridge.
9 – Approximately Station 113+90. Drainage ditch south of old KY 22.	Channel Lining	Turf reinforcement mat.
10 – Approximately Station 119+00. Drainage ditch south of newly constructed KY 22.	Channel Lining	Turf reinforcement mat.
11 – Approximately Station 121+70 to Station 122+20. Drainage ditch north of the newly constructed road.	Channel Lining	Turf reinforcement mat.
12 – Approximately Station 121+85. Drainage ditch south of the newly constructed bridge	Channel Lining	Turf reinforcement mat.
13 – Approximately Station 123+25 to Station 124+00. Drainage ditch south of newly constructed road.	Channel Lining	Turf reinforcement mat.

**3.3.1.1 Live Stakes**

The following plant species can be used as live stakes for this project:

Common Name	Species Name	Stems per acre	Frequency (%)
Silky Dogwood	<i>Cornus amomum</i>	750	25
Black Willow	<i>Salix nigra</i>	750	25
Silky Willow	<i>Salix sericea</i>	750	25
Elderberry	<i>Sambucus canadensis</i>	750	25
<b>Total</b>		3000	100

The live stakes should be 18 to 24 inches long and planted such that the species are intermixed, not clumped.

**3.3.1.2 Container Plantings**

The following plant species can be used as container plantings for this project:

Common Name	Species Name	Stems per acre	Frequency (%)
River Birch	<i>Betula nigra</i>	28	10
Silver Maple	<i>Acer saccharinum</i>	28	10
Sycamore	<i>Platanus occidentalis</i>	28	10
Pin Oak	<i>Quercus palustris</i>	28	10
Northern Red Oak	<i>Quercus rubra</i>	28	10
Persimmon	<i>Diospyros virginiana</i>	28	10
Tuliptree	<i>Liriodendron tulipifera</i>	28	10
American Hornbeam	<i>Carpinus caroliniana</i>	28	10
Rough-leaf Dogwood	<i>Cornus drummondii</i>	28	10
Spicebush	<i>Lindera benzoin</i>	28	10
<b>Total</b>		280	100

**3.3.1.3 Estimate of Additional BMP Quantities**

The following table is an estimate of the quantities of post-construction BMPs needed on this project that were not included in the original design.

BMP	Unit	Quantity
Turf Reinforcement Mat (TRM)	Square Yard	1250
Enhanced Silt Traps (EST)	Each	1
Container Plantings (CP) and Mulch	Acre	1.1
Spill Containment Area	Each	2
Bank Stabilization with Live Staking	Square Yard	580
Bank Stabilization with Existing Root Material	Linear Foot	360

**3.3.2 Effort to Minimize Discharges**

During the design of this project, consideration was given to reducing the number of discharge locations. This effort led to allowing sheet flow to occur in many locations as shown on the Erosion Control Sheets. As well two discharges were originally planned for on the west end of the project, but these were consolidated into one.

**3.3.3 Evaluation of Alternative Discharge Locations**

The project was evaluated for alternative discharge locations. Due to the topography of the site there were no other viable alternatives.

### **3.3.4 Alternative Post-Construction BMPs**

Various post-construction BMPs were considered for this project. The ones selected were chosen because of the soil type, the available area, the topography and the amount of flow to manage.

### **3.4 ASSESMENT OF JUSTIFIABLE RISK**

This project will be replacing a bridge that has reached the end of its useful life, which will lead to safer passage through this portion of the road and elevate the road to or above the 100 year floodplain elevation.

### **3.5 SOCIOECONOMIC DEMONSTRATION**

The following questions were addressed to demonstrate the socioeconomic considerations for this project.

**Describe the effect of the project on the employment of the area.** The proposed project will allow the traveling public and local residents safer and more efficient access to employment opportunities within the project area by replacing a substandard bridge with a modern bridge that meets current design standards. The project will also provide opportunities for local residents to realize economic benefit by employment opportunities during the construction and maintenance of the facility.

**Describe how the project will increase or avoid the decrease of area employment.** Due to the nature of employment in the area, the proposed project will likely have a negligible affect on employment but will allow area residents to maintain employment by allowing the traveling public to continue to maintain access to employment opportunities.

**Describe the project's industrial or commercial benefits to the community.** The project will benefit the community both short-term and long-term. Short-term benefits will be realized through employment during the construction phase of the project. Local and regional businesses may also enjoy economic benefits from contractors and their employees purchasing materials, goods, and services in the project area. The community and region may experience long-term benefits from the project as maintenance, bridge inspections, and other activities associated with the maintenance of the facility require materials, goods, and services to be purchased.

**Describe any other economic or social benefits the project will have to the community.** Due to the local recreation in the area this project will incorporate bicycle and pedestrian traffic into the design. Access from the main urban area to a boat ramp and recreational access to the river is an attraction for the area for tourist and local residence. This access is especially important due to the "Ramblin' River Tour" bicycle route that passes through the project area along KY 22 and then follows KY 159 toward Kincaid Lake State Park and Recreation Area.

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**How many and in what manner will households be economically or socially impacted?**

There is an anticipated six jobs that will be developed during the construction and maintenance of the project. Therefore, up to six households in the area will be economically benefited by new employment or better employment.

	YES	NO
1. Will this project be likely to change median household income in the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Will this project likely change the market value of taxable property in the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Will this project increase revenues in the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Will any public buildings be affected by this project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>